Introduction

It is estimated that 23% of the 4 million neonatal deaths globally are related to neonatal hypoxia at birth (Lawn et al 2010). 98% of the 4 million neonatal deaths are in the developing world of which Zambia is one country (Lawn et al 2007; Carlo et al. 2009).Zambia currently records a neonatal mortality rate of 24:1000 births which is more than ten times higher than the UK (Mothers and Babies: Reducing Risk through Audits and Confidential Enquiries across the UK (MBRRACE-UK) 2017; Office for National Statistics (ONS) 2018). Unfortunately most of these deaths are due to lack of knowledge and skills in the appropriate management of the neonate at birth (Disu et al 2015). Global priorities and targets for improving the newborn experience have been encapsulated in various forms including the United Nations (UN) Millennium Development Goals 4 & 5 which focused on reducing neonatal morbidity and mortality (UN 2015). More recently this has been accentuated in the United Nations Development Programme (UNDP) Sustainable Development Goal 3 which has amongst its targets to reduce neonatal mortality to less than 12:1000 live births by 2030 (UNDP 2016).

Background

A scoping exercise was undertaken in 2015 with the intention of informing the development of a neonatal course in Zambia. This revealed the need to develop health care professional knowledge and skills in the management of the neonate at birth including neonatal resuscitation skills (Kayembe 2016). There are a number of educational interventions aimed at reducing neonatal mortality in many developing country settings. These include Helping Babies Breathe (HBB), an adaptation of the American Neonatal Resuscitation Programme (American Academy of Pediatrics (AAP) 2017; Odidja 2017), and the World Health Organisation (WHO) Essential Newborn Care (ENC) programme (World Health Organisation 2010; Carlo et al 2010; Gouda et al 2012) which is the largest form of intervention aimed at low resource settings (Bang et al. 2014). However most of these interventions do not proceed beyond airway support and ventilation breaths (American Academy of Pediatrics (AAP) 2017). In Zambia paediatric life support training, which originates from the UK, has been delivered (Tyndall et al. 2013). However the particular training that was documented in this package focused on the paediatric patient (from one month to 2 years of age) rather than the newborn (from birth to one month) (United States Food and Drug Administration (US FDA) 1998). In the current model the intervention provided an opportunity to address these apparent limitations. Importantly not only did the model add other interventions such as cardiac compressions and drugs, it also focused on the newborn rather than the paediatric patient.

Within midwifery education it is important that midwives are competent in the provision of effective care of the neonate which includes resuscitation and management at birth (International Confederation of Midwives (ICM) 2013). It is also essential that this knowledge and skill is maintained through the provision of continuing professional development (CPD) (Thomson 2017). CPD is only just starting to be addressed within Zambia. Therefore the programme presents a useful, bespoke addition to existing education provision which should facilitate and support the development of relevant practical skills (Crisp 2007). Midwives are in a unique position to lead health promotion particularly in relation to the reduction of neonatal morbidity and mortality globally (ICM 2013; UNFPA ICM WHO 2014). The provision of midwifery education in the area of neonatal life support therefore provides an opportunity to influence global health care challenges as a result of partnership working (Crisp 2007). This paper therefore aims to share the development, implementation and immediate evaluation of a bespoke programme of neonatal resuscitation, which has as its intention the improvement of knowledge and skills of midwives and other professionals attending births in Zambia.

Model and methods

Content and strategy of the educational model

This programme was driven and developed by the author who is a midwifery educationalist as a result of discussions with clinicians and other stakeholders and partners in the UK and the local area where the programme was to be delivered. The training employed a “train the trainer” (TTT) approach to facilitate continuation of the programme (Disu et al 2015). Four staff from the UK: the author, Senior Resuscitation Officer, Clinical Education Nurse Specialist and a Consultant Neonatologist, delivered the training programme over the course of a week.

Training was adapted with kind permission for use of material from the Newborn Life Support (NLS) UK (Wyllie et al, 2015) and was offered using interactive didactic lectures, skills and scenario sessions. Altogether the programme was delivered several times in a week; each session was evaluated and contributed to the overall evaluation of the programme.

The session topics included the following: immediate care at birth, newborn physiology, resuscitation at birth, prematurity and meconium, teamwork, communication and documentation, and post resuscitation care. Additionally, each attending practitioner was supplied with a stethoscope, fob watch and memo card containing the resuscitation algorithm and key points from the training. This was intended to facilitate application of knowledge to clinical practice, which was a strategy similar to that employed by Disu et al’s study in Nigeria (2015). A copy of the presentation and algorithm was also given to each participant together with a section that was envisioned would facilitate reflection on practice that could be collated and used as part of the evaluation later. The use of reflection in this way has been shown to enhance the development of skills and knowledge in the clinical setting (Ghaye, 2005).

Setting and Participants

The bespoke programme was delivered at the Chainama School of Anaesthesia in Lusaka, Zambia in the summer of 2016. The participants included: 50 health care professionals. The participants were midwives and other members of staff including: nurses, paediatricians and some anaesthetists. An outreach approach was used (Disu et al. 2015) involving staff attending from district health centres which surrounded and made patient referrals to the main hospital.

Evaluation

The role of neonatal resuscitation programmes in terms of enhancing staff knowledge and skills and ultimately reducing neonatal morbidity and mortality rates through the transfer of knowledge and skills is clearly articulated by Pammi et al (2016) in their systematic review and meta-analysis of new-born resuscitation training programmes. Both qualitative and quantitative evaluation from the initial training was undertaken before and after each session to provide feedback to facilitators about the effectiveness of the teaching (La Duke 2017) as well as to inform future training. This data was collated to form overall pre- and post-session evaluation. This feedback was very positive. Quantitative assessment was by pre- and post training questions which required a true/false answer together with three free text questions. For example: ‘*When a baby is born, you would perform an initial assessment to decide on whether they needed any resuscitation. What four things would you look at to help you decide? (4) Marks)’.*

This was useful in gaining feedback on the effectiveness of the programme with regards to the impact on knowledge levels (Kirkpatrick & Kirkpatrick 2006). In this assessment there was no pass/fail limit, as the focus was to provide feed-forward advice for learning (Duncan 2007). The score was calculated out of a maximum total of 30. The total average pre-test score was 63.5% whilst the total average post-test score was 83.8%. There was a

demonstrable increase in knowledge by every individual except for two where no increase in knowledge was evident. The reason for the lack of increase in knowledge in the two participants were unknown. Additionally verbal and written feedback was provided to participants about the practical skills sessions. Using feedback in this way is recognised within the literature as being advantageous to the improvement of performance whilst supporting the provision of quality care (Flottorp, Jamtvedt, Gibis and McKee, 2010) and as such was considered an important element of the training strategy.

Sustainability and Future Practice Implications

It was anticipated that the project would create a rolling programme of neonatal resuscitation training in the country, which would ultimately contribute towards the improvement of neonatal morbidity and mortality rates in the capital and its surrounding districts (Disu et al 2015). It is however acknowledged that measuring neonatal morbidity and mortality rates may be a much more complex issue due to the range of possible contributing factors (Office of National Statistics 2017). This in turn might make it difficult to prove cause and effect based solely on this intervention (Blencowe 2016). As a consequence of clinical experience and the ability to impact others in their role, 12 staff were pre-selected by Zambian partners to undertake instruction as trainers in order to perpetuate the training programme. These trainers received an additional day's instruction which included the principles and practice of facilitating and organising training, discussion of teaching methods and encouraged development of SMART goals (Drucker 2007) with regards to clinical application as well as the cascade of training. Additionally, clinical knowledge and skill sessions were revisited and individually assessed with tailored written feedback provided to the trainers (Mirzaee & Hasrati 2014). Although initially an ongoing assessment approach without testing was agreed as part of the programme, it became necessary to re-examine this to ensure that the trainers had appropriate knowledge and to confirm that skill standards were met.

The additional one-day training session was held to ensure that the 12 trainers had the relevant skills to be able to continue to support the programme (Disu et al 2015). For example, trainers underwent a testing session together with feedback and additional support where needed. These 12 trainers also received a memory stick of all the presentations and relevant administrative material. Of the 12, three team leaders were selected. The selection of these team leaders was based on individual performance from ongoing assessment and reflected a diverse staff skill mix. This selection was further supported by consultation with peers which was considered important to establish team ownership, due regard and participation (McClough 2003). Consequently, a midwife, paediatric nurse educator and a paediatrician were selected as team leaders. These practitioners were assigned the training equipment including mannequins, simulation accessories and algorithm posters. Together the 12 trainers were encouraged to develop strategies and goals for the implementation and continuation of the training which included teaching on education programmes. Furthermore, the trainers were asked to consider key points from the training to apply in their individual clinical settings.

Discussion and Conclusion

The benefits to participants included: increased knowledge and skills in the appropriate management and resuscitation of the neonate at birth. Some of the key learning points from the planning and implementation of the project include the importance of recognising the influence of other methods of training the candidates may have previously received. In terms of the training programme, pre-prepared feedback templates for ongoing candidate assessment could also be developed to improve time management on the teaching days (Flottorp, Jamtvedt, Gibis and McKee, 2010). Although the approach in this programme for pre-selection of trainers by the host site was employed, a combined approach that incorporates confirmation of suitability through a process of objective assessment and feedback by programme facilitators may be more reliable (Mirzaee & Hasrati 2014).

Future changes that could be utilised include an integration of local needs within the training schedule without compromising the original underpinning content or vision (Jones 2013). Key priorities such as kangaroo mothercare (Boundy et al.2015;
World Health Organisation 2015) together with relevant policy implications are possible considerations which could broaden the programme content.
Other suggestions for future development of the programme include:

- additional CPD and refresher support for the trainers
- exploring the feasibility of an exchange programme with trainers to facilitate sharing of good practice
- further rollout to other areas of the country
- future evaluation to include measurement of the impact of training on neonatal mortality rates.

Consequently, with relevant support and resources, based upon mutually strong and respectful partnership working (Taylor 2017), it is possible that additional low income countries could successfully adopt a similar training strategy.

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